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FLOOD INSURANCE STUDY

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BOROUGH OF ATLANTIC HIGHLANDS, NEW JERSEY
MONMOUTH COUNTY

FEBRUARY 3, 1981

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER -340286

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FLOOD INSURANCE STUDY
BOROUGH OF ATLANTIC HIGHLANDS, NEW JERSEY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Borough of Atlantic Highlands, Monmouth County, New Jersey, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Atlantic Highlands to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the New Jersey Department of Environmental Resources for the Federal Insurance Administration, under Contract No. A14516. This work was completed in November 1979. The hydrologic and hydraulic analyses for this study were conducted by T & M Associates under subcontract to the New Jersey Department of Environmental Protection.

1.3 Coordination

An Initial Consultation and Coordination Officer's (CCO) meeting was held, with the borough engineer to discuss flood problems with the community, to obtain input from the borough, and to identify the streams to be studied by detailed methods. A search for basic data was made on all levels of government. The State of New Jersey provided tidal flood

information and copies of other relevant Flood Insurance Studies. In addition, the Monmouth County Planning Board provided an updated street map.

On June 5, 1980, a final (CCO) meeting was held to review the results of the study. The meeting was attended by representatives of the Borough of Atlantic Highlands, the FIA and the study contractor.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Borough of Atlantic Highlands, Monmouth County, New Jersey. The area of study is shown on the Vicinity Map (Figure 1).

Flooding along Wagner Creek and Many Mind Creek was studied by detailed methods, and was found to be completely controlled by flooding from Sandy Hook Bay. The coastal area at Sandy Hook Bay was studied by detailed methods to evaluate the influence of tidal flooding. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through November 1984.

Tributaries to Wagner Creek and Many Mind Creek were studied by approximate methods. Approximate methods of analyses were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the FIA. Although these streams were studied, negligible flood hazards were found to exist and no flood boundaries were mapped.

2.2 Community Description

The Borough of Atlantic Highlands is located in northeastern Monmouth County, New Jersey, approximately 15 miles south of New York City. It is bordered on the north by Sandy Hook Bay, on the west and south by the Township of Middletown, and on the east by the Borough of Highlands.

The Borough of Atlantic Highlands was originally settled as a portion of the Township of Middletown in 1669, and was primarily agricultural at that time. Further development of the area was directed toward maritime and recreational interests. The Borough of Atlantic Highlands was incorporated in 1887.

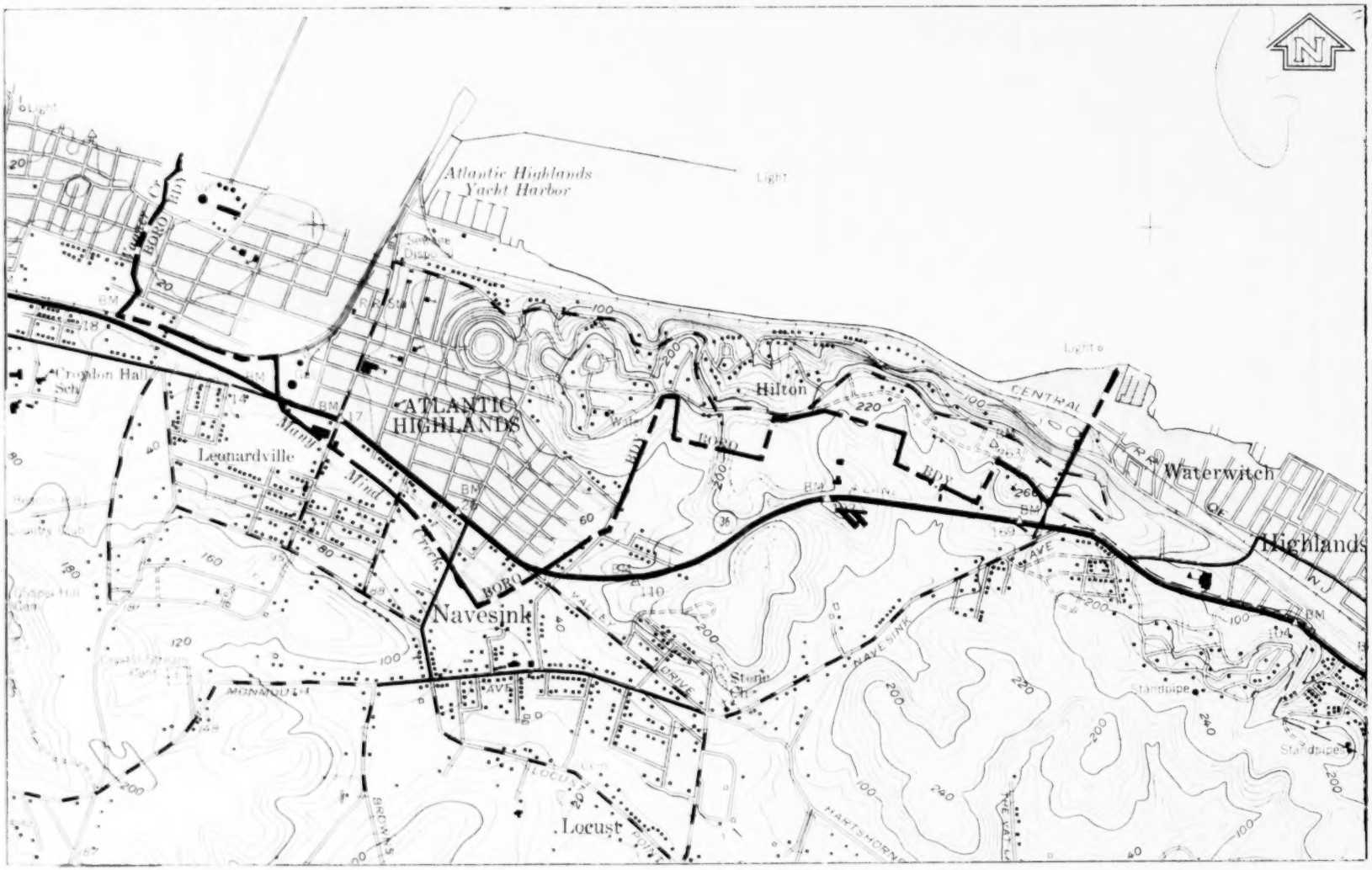

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

BOROUGH OF ATLANTIC HIGHLANDS, NJ
(MONMOUTH CO.)

APPROXIMATE SCALE
4 0 4 8 12 MILES

VICINITY MAP

The total land area of Atlantic Highlands is 1.3 square miles, with a population of 5,102 according to the 1970 census. The Monmouth County Planning Board estimated the 1978 population to be 5,440 and projected a 1985 population of 6,100 for the borough.

The Borough of Atlantic Highlands is primarily a residential area. The municipal harbor includes a federal anchorage. The economy of the area is commercial and recreational with a limited amount of industrial development.

Wagner Creek originates in northeastern Township of Middletown as a combination of several smaller tributaries and flows into Sandy Hook Bay. This creek forms the western corporate limits of the borough. Many Mind Creek, which originates in the Navesink section of the Township of Middletown, forms a portion of the eastern and southern corporate limits of the Borough of Atlantic Highlands before flowing into Sandy Hook Bay.

The topography of the Borough of Atlantic Highlands slopes westward from hilly high lands to relatively flat low lands in the western area of the borough. The high terrain falls off sharply in the north, forming a steep bluff which is separated from the bay by a narrow beach.

The Borough of Atlantic Highlands has a temperate climate with warm summers and moderate winters. The mean annual temperature is 53 degrees Fahrenheit (°F), with an average temperature of 75°F in July and 21°F in January. An annual rainfall of 53 inches was recorded for 1977.

2.3 Principal Flood Problems

The borough engineer noted that West Highlands Avenue in the area of Wagner Creek is subject to flooding during severe storm conditions, due to insufficient drainage in the area.

2.4 Flood Protection Measures

The Borough of Atlantic Highlands employs no formal flood protection measures. However, development in the flood plain is regulated by the New Jersey Department of Environmental Protection (NJDEP). The borough does clean stream channels and drainage facilities of debris and siltation according to need.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be

equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for the flooding source studied in detail affecting the community.

Stage-frequency data for the tidal effects from Sandy Hook Bay for the study of coastal areas of the borough, as well as the study of Wagner Creek and Many Mind Creek were based upon adopted tidal flood elevations. The adopted elevations were determined by the joint probability method which provides statistical analyses of characteristics of observed storms in this area of New Jersey (Reference 1).

The drainage basin of each tributary not included in the detailed study was isolated and individually analyzed for runoff resulting from a storm with a 100-year recurrence interval. Discharge information used in the analysis of the areas studied by approximate methods were determined by the Rational Method using Sandy Hook, New Jersey intensity curves.

A summary of peak elevation-frequency relationships for the areas studied by detailed methods is shown in Table 1, "Summary of Elevations."

TABLE 1 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
SANDY HOOK BAY				
Entire shoreline within the Borough of Atlantic Highlands	7.2	10.1	11.6	14.0

3.2 Hydraulic Analyses

Hydraulic analyses of the shoreline characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

The method of tidal elevation determination provides estimates of the elevations of floods of selected recurrence intervals along Wagner Creek and Many Mind Creek. Therefore, no hydraulic analyses were required for flood boundary determination for those streams.

For the areas studied by approximate methods, estimated runoff was used to determine the water-surface elevation in each tributary.

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the map.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. The 100- and 500-year boundaries were delineated using topographic maps of the study area at a scale of 1:2,400, with a contour interval of 5 feet (Reference 2). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

Flood boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year flood boundary corresponds to the boundary of the areas of special flood hazards (Zone A9), and the 500-year flood boundary corresponds to the boundary of areas of moderate flood hazards (Zone B).

Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for the flooding source affecting the Borough of Atlantic Highlands.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses or waterbodies having relatively the same flood hazard. In tidal areas, reaches are limited to the distance for which the difference between the 10- and 100-year flood elevations does not vary more than 1.0 foot. Using these criteria, the entire shoreline within the Borough of Atlantic Highlands qualifies as one reach whose flooding source is Sandy Hook Bay. The locations of these reaches are shown on the Flood Insurance Rate Map.

5.2 Flood Hazard Factors

The FHF is the FIA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Borough of Atlantic Highlands was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A9: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.

Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the

Zone B: (continued)	100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding source studied in detail in the Borough of Atlantic Highlands.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Borough of Atlantic Highlands is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

The Borough of Highlands was studied by the New York District of the U. S. Army Corps of Engineers in June 1971, revised in October 1973 (Reference 3).

A Flood Insurance Study for the adjacent Township of Middletown has been prepared (Reference 4). Flood boundaries for Wagner Creek, Many Mind Creek and the Sandy Hook Bay coastal area correspond exactly between this Flood Insurance Study and that for the Township of Middletown.

A map of flood-prone areas in the Borough of Atlantic Highlands was prepared by the U. S. Geological Survey in 1972 (Reference 5). The flood boundaries delineated there were estimated from profiles based on high-water marks and regional stage-frequency relations.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Sandy Hook Bay Reach 1	01	-4.4	-1.2	+3.1	045	A9	12

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

BOROUGH OF ATLANTIC HIGHLANDS, NJ

(MONMOUTH CO.)

FLOOD INSURANCE ZONE DATA

SANDY HOOK BAY

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

8.0 BIBLIOGRAPHY AND REFERENCES

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